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U.S. Department of Energy
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Field Sampling Plan for the Waste Area Group 5, Remedial Action, Phase II

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Approved by:

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12/13/00
Date

ABSTRACT

This field sampling plan outlines the collection and analysis of samples in support of Phase II of the Waste Area Group 5, OU 5-12, remedial action, which is being performed as defined in the *Final Record of Decision for Power Burst Facility and Auxiliary Reactor Area.*

Phase II addresses the remedial actions at three contaminated soil sites, including the Auxiliary Reactor Area (ARA)-01 Chemical Evaporation Pond, the ARA-12 Radioactive Waste Leach Pond, and the ARA-23 Radiologically Contaminated Soils. Contaminated soil will be removed during Phase II activities from the three Comprehensive Environmental Response, Comprehension and Liability Act (CERCLA) sites and dispositioned at the Idaho National Engineering and Environmental Laboratory (INEEL) CERCLA Disposal Facility (ICDF), or other approved disposal facility on the INEEL. Samples may need to be collected from the excavated soils to demonstrate compliance with the yet to be developed ICDF waste acceptance criteria. Field screening surveys will be performed at the sites after removal of the first layer of contaminated soil to identify hot spots for the contaminants of concern. If hot spots are identified as exceeding the remedial action goals, additional selective excavation will occur to remove the hot spots. The area will then be resurveyed and verification samples collected to demonstrate that contamination has been removed to levels below the remedial action goals. Contaminated soils will be removed and remaining soils screened through an iterative process until field screening results show that contaminant concentrations are at or below the remedial action goals for the respective site. Verification sampling and in situ measurements will be performed to demonstrate that the remedial action goals are met in accordance with the *Final Record of Decision for Power Burst Facility and Auxiliary Reactor Area.*

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ACRONYMS

ARA	Auxiliary Reactor Area
ARAR	applicable or relevant and appropriate requirement
BBWI	Bechtel BWXT Idaho, LLC
CC	Construction Coordinator
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	Central Facilities Area
CFR	Code of Federal Regulations
COC	contaminant of concern
CSA	CERCLA storage area
CWSU	CERCLA waste storage unit
D&D&D	deactivation, decontamination and dismantlement
DOE-ID	Department of Energy Idaho Operations Office
DOT	Department of Transportation
DQO	Data Quality Objective
DS	decision statement
EPA	Environmental Protection Agency
ER	environmental restoration
ERDF	Environmental Restoration Disposal Facility
ERPC	Environmental Restoration Program Coordination
ES&H	environment, safety and health
FSP	field sampling plan
FTL	field team leader

FUM	Facilities, Utilities and Maintenance
GPRS	global positioning radiometric scanner
HASP	health and safety plan
HPGe	high-purity germanium
HSO	health and safety officer
ICDF	INEEL CERCLA Disposal Facility
IH	industrial hygienist
INEEL	Idaho National Engineering and Environmental Laboratory
JSS	job site supervisor
MCP	management control procedure
OSHA	Occupational Safety and Health Administration
OU	operable unit
PBF	Power Burst Facility
PM	project manager
PPE	personal protective equipment
PQL	practical quantitation limit
PRD	program requirements directive
PSQ	principle study question
QA	quality assurance
QA/QC	quality assurance/quality control
QAPjP	Quality Assurance Project Plan
RADCON	radiological control
RCRA	Resource Conservation Recovery Act
RCT	Radiological Control Technician
ROD	record of decision
RRWAC	reusable property, recyclable materials, and waste acceptance criteria

RWMC	Radioactive Waste Management Complex
S&H	safety and health
S&H/QA	Safety & Health/ Quality Assurance
SAP	sampling and analysis plan
SL-1	Stationary Low-Power Reactor No. 1
SMO	Sample Management Office
SP	Safety Professional
SPERT	Special Power Excursion Reactor Test
STL	sampling team leader
TPR	Technical procedure
UCL	Upper confidence limit
WAC	waste acceptance criteria
WAG	waste area group
WERF	Waste Experimental Reduction Facility (PBF)
WGS	Waste Generator Services
WROC	Waste Reduction Operations Complex
XRF	x-ray fluorescence

Field Sampling Plan for the Waste Area Group 5, Remedial Action, Phase II

1. OVERVIEW

The sampling and analysis plan (SAP) for the Idaho National Engineering and Environmental Laboratory (INEEL) Waste Area Group (WAG) 5 Remedial Action is comprised of two parts:

- Field sampling plan (FSP)
- Quality assurance project plan (QAPjP).

These plans have been prepared in accordance with the *National Oil and Hazardous Substances Contingency Plan*, (U.S. Environmental Protection Agency [EPA] 1990), guidance from the EPA on the preparation of SAPs, and Management Control Procedure (MCP)-241, "Preparation of Characterization Plans" (INEEL 1996a). The FSP describes the field sampling activities that will be performed, while the QAPjP details the processes and programs that will be used to ensure that the data generated are suitable for their intended uses. The governing QAPjP for this sampling effort will be the *Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10 and Inactive Sites* (U.S. Department of Energy Idaho Operations Office [DOE-ID] 2000a). This document is incorporated herein by reference. Work control processes will follow formal practices as per communicated agreement between the appropriate site area directors and the environmental restoration (ER) project manager.

1.1 Field Sampling Plan

The remedial action for WAG 5 is divided into two phases. Phase I is specific to tanks and inactive septic system components located at the Auxiliary Reactor Area (ARA). Phase II is concerned with the remediation of contaminated soils located at ARA. The purpose of this FSP is to guide the collection and analysis of samples required to confirm that the remedial action objectives for Phase II have been met by the remedial action. The project is being conducted in accordance with the requirements set forth in the *Final Record of Decision for Power Burst Facility and Auxiliary Reactor Area* (DOE-ID 2000b).

The selected remedy for WAG 5 comprises three remedial actions to mitigate the risks associated with seven specific sites. The Phase II remedial action addresses a collection of five individual sites (ARA-01, ARA-12, ARA-23, ARA-25, and Power Burst Facility [PBF]-16) where contaminated soil is the only source medium.

The Phase II sites covered under this FSP that require remedial action under the operable unit (OU) 5-12 Record of Decision (ROD) (DOE-ID 2000) include the ARA-I Chemical Evaporation Pond (ARA-01), the ARA-III Radioactive Waste Leach Pond (ARA-12), and the ARA-I and ARA-II Radiologically Contaminated Soils (ARA-23).

The remedial action for ARA-25 may occur as part of the Phase I activities. This is attributed to the fact that some of the stainless steel piping associated with the ARA-16 site intersects the soils and concrete foundation walls associated with the ARA-25 site. To expose the ARA-16 piping, it will be necessary to excavate some of the ARA-25 soils, as well as to remove part of the foundation walls. Depending upon the extent of these activities, it may be best to remove all the soils and at least part, if not all, the foundation walls. The final decision will be made once field activities commence and the actual extent of soil removal and foundation removal is determined. If it is decided to continue with the

remediation of the ARA-25 site, limited sampling of the site will be required and is addressed in the *Field Sampling Plan for the Waste Area Group 5 Remedial Action, Phase 1* (DOE-ID 2000c).

Surface and subsurface sampling of the PBF-16 leach pond was performed in June of 2000 to determine the extent of mercury contamination in excess of the 0.5 mg/kg remedial action goal (DOE/ID—10700). Mercury was identified as posing an unacceptable ecological risk in the OU 5-12 comprehensive RI/FS baseline risk assessment (DOE/ID-10607). The analytical data from the soil sample analyses show that the average mercury concentration in the surficial and subsurface soils at the PBF-16 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site is less than the 0.5 mg/kg. The maximum concentration detected in surface soils was 0.12 mg/kg. The maximum concentration detected in subsurface soils was 0.23 mg/kg at a depth interval of 0.15 to 0.45 m (0.5 to 1.5 ft). There was no mercury detected at depth intervals below this (Kirkpatrick 2000). As a result, there will be no further sampling at the PBF-16 site.

1.1.1 Field Sampling Objectives

The purpose of this field sampling plan is to guide the collection and analysis of field screening data and soil samples at three CERCLA sites in OU 5-12 at the INEEL, including the ARA-I Chemical Evaporation Pond (ARA-01), the ARA-III Radioactive Waste Leach Pond (ARA-12), and the ARA-I and ARA-II Radiologically Contaminated Soils (ARA-23). The primary objective of this field sampling effort is to verify that contaminant concentrations at the three CERCLA sites are below the remedial action goals defined in the record of decision.

As part of the Phase II remedial action, hot spots inside the Stationary Low-Power Reactor No. 1 (SL-1) burial ground will also be remediated in conjunction with the ARA-23 site remediation. At the conclusion of the remedial action, verification samples will be collected at all remediated sites to demonstrate compliance with the remedial action objectives as stated in the ROD (DOE-ID 2000b).

1.1.2 Other Documentation

The health and safety plan (HASP) prepared for this project, *Health and Safety Plan for Operable Unit 5-12 Remedial Design/Remedial Action Projects* (INEEL 2000a), covers the activities associated with the remediation of the seven sites, activities associated with disposition of the four inactive septic systems, and activities associated with WAG 5 groundwater monitoring. The HASP includes an auditable safety analysis in accordance with the *Hazard Classification for Remedial Activities at Eleven OU 5-12 Sites: ARA-01, ARA-02, ARA-07, ARA-08, ARA-12, ARA-13, ARA-16, ARA-21, ARA-23, ARA-25, and PBF-16* (INEEL 2000b).

The *Interface Agreement Between the Environmental Restoration Program, Waste Area Groups 4, 5, 10, and deactivation, decontamination, and dismantlement (D&D&D) and the Central Facilities Area* (INEEL 1999a) is specific to activities carried out at ARA, which come under the purview of the Central Facilities Area (CFA) Site Area Director.

1.2 Project Organization and Responsibility

The organizational structure for this work reflects the resources and expertise required to plan and perform the work, while minimizing risks to worker health and safety. Job titles of the individuals who will be filling the key managerial roles and lines of responsibility and communication are shown on the organization chart in Figure 1-1. The following sections outline responsibilities of key site personnel, as well as other personnel who may be present at the task-site.

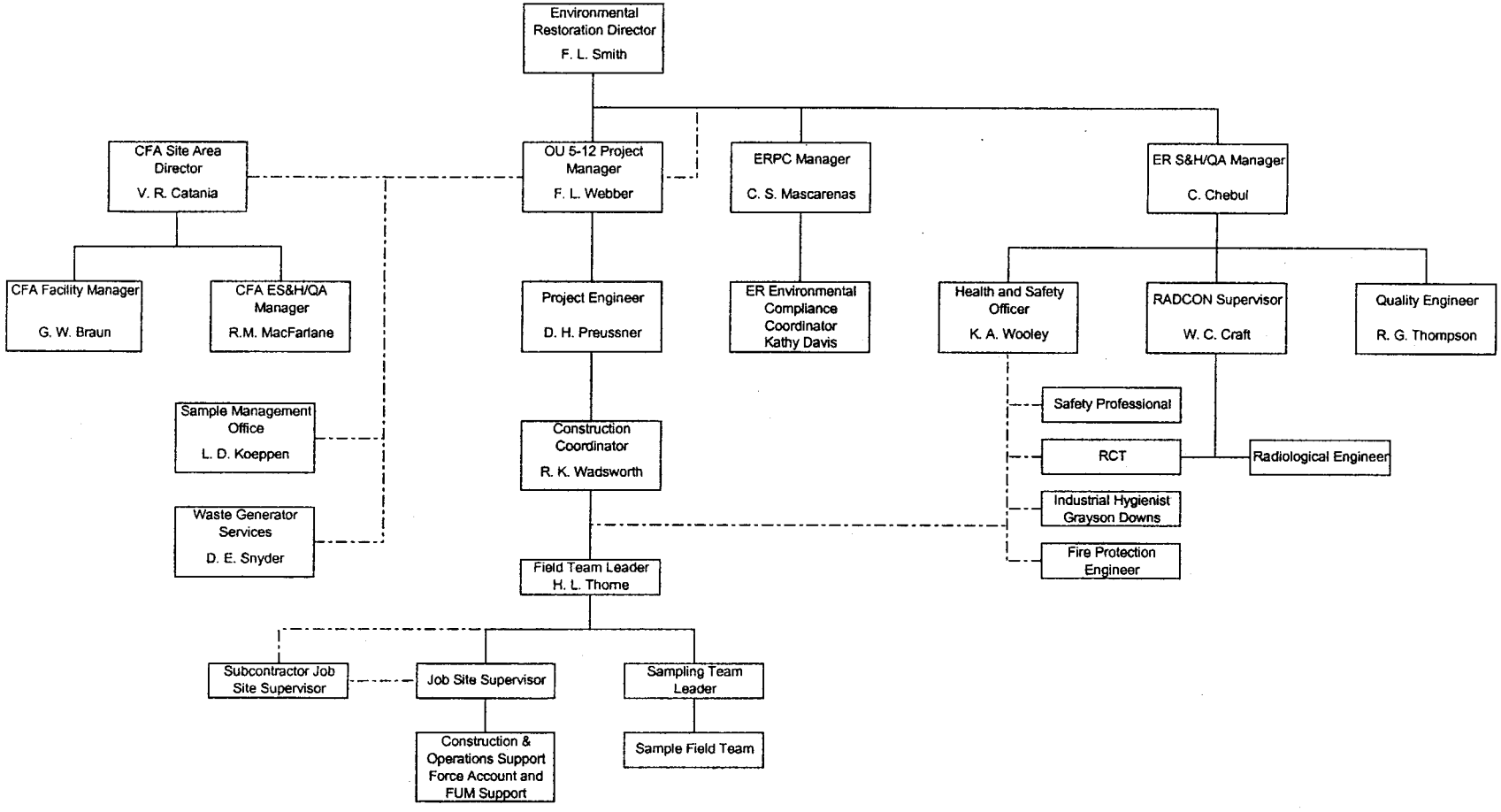

Figure 1-1. Organization chart.

1.2.1 Environmental Restoration Director

The ER Director has ultimate responsibility for the technical quality of all projects, for the maintenance of a safe environment, and for the safety and health of all personnel during field activities performed by or for the ER program. This person provides technical coordination and interfaces with the DOE-ID Environmental Support Office. The ER Director has the following responsibilities:

- Ensuring project/program activities are conducted according to all applicable federal, state, local, and company requirements and agreements
- Ensuring program budgets and schedules are approved and monitored to be within budgetary guidelines
- Ensuring personnel, equipment, subcontractors, and services are available
- Ensuring direction is provided for the development of tasks, evaluation of findings, development of conclusions and recommendations, and production of reports
- Ensuring all project documentation is submitted to the ER/D&D&D Operational Review Board for review, and is in compliance with STD-101, "Integrated Work Control Process" (INEEL 1999b) before work begins.

1.2.2 Project Manager

The WAG 5 Project Manager (PM) ensures that all activities conducted during the project comply with INEEL MCPs and program requirements directives (PRDs) and that all applicable requirements from the Occupational Safety and Health Administration (OSHA), EPA, U.S. Department of Energy (DOE), U.S. Department of Transportation (DOT), and the State of Idaho.

The functions and responsibilities of the PM include the following items:

- Ensuring that tasks comply with the *Implementing Project Management Plan for the Idaho National Engineering and Environmental Laboratory Remediation Program* (INEEL 1998a), the QAPjP (DOE-ID 2000a), the HASP (INEEL 2000a), and this FSP
- Coordinating all document preparation, as well as field, laboratory, and modeling activities, and is responsible for the overall scope, schedule, and budget of the project
- Implementing the project requirements
- Ensuring work is performed as planned for the project
- Developing resource-loaded, time-phased control account plans based on the project's technical requirements, budgets, and schedules
- Assigning project tasks
- Ensuring the technical review and acceptance of all project documentation
- Developing the documentation required to support the project
- Developing the site-specific plans required by the ER program, such as work plans, environmental, safety, and health (ES&H) plans, SAPs

- Ensuring that project activities and deliverables meet schedule and scope requirements as described in the *Federal Facility Agreement and Consent Order*, Attachment A, Action Plan for Implementation of the Federal Facility Agreement and Consent Order (DOE-ID 1991) and applicable guidance

- Identifying the requirements and scheduling, and supporting the CERCLA and the National Environmental Policy Act public review and comment process

- Ensuring compliance with Conduct of Operations and verifying that the hazards checklist and job safety analysis is completed as required by STD-101, Integrated Work Control Process (INEEL 1999b)

- Identifying the subproject technology needs

- Coordinating and interfacing with the units within the program support organization on issues relating to quality assurance (QA), ES&H, and National Environmental Policy Act support for the project

- Coordinating the collection of site-specific data, its review for technical adequacy, and its input to an approved database such as the Environmental Restoration Information System

- Coordinating and interfacing with field operations to ensure that milestones are met, adequate management support is in place, technical scope is planned and executed appropriately, and project costs are kept within budget.

1.2.3 Project Engineer

The Project Engineer is responsible for the execution of the project's technical work. This will include but not be limited to the following items:

- Supervising engineers to ensure that timely, cost-effective engineering and design services are performed in accordance with project orders and directives, using sound engineering practices and high technical standards

- Providing technical resource and schedule integration, establishing priorities, and identifying and requesting resources necessary to accomplish work objectives for all assigned engineering and design activities

- Ensuring that the work to be performed is clear, concise, and executable by working with the customer and the project manager to establish firm project/task requirements

- Developing project technical execution strategy and ensuring that cost-effective design solutions are developed in accordance with safety, environmental, and quality objectives

- Reviewing project status and variances and providing corrective actions

- Resolving conflicts regarding project requirements and project team members' comments on design, including defending and selling design positions to the project team and the Agencies.

In addition, the Project Engineer is responsible for the project's technical staffing. This will include serving as an interface between the PM and the appropriate functional managers of the organizations providing the technical staff. The Project Engineer will be accountable to the PM for all cost and schedule performance of the assigned technical tasks and to the functional managers for the technical quality of a project's work products. This individual is also responsible for coordinating all ER project designs with the appropriate Site Area Director's engineering manager. The Project Engineer will complete the Hazards Profile Screening Checklist as per STD-101 "Integrated Work Control Process" (INEEL 1999b).

1.2.4 Central Facilities Area Site Area Director

The CFA Site Area Director has the authority and responsibility to ensure proper ownership of all activities within the ARA site for all work processes and work packages including but not limited to the following items:

- Establishing and executing monthly, weekly, and daily operating plans
- Executing the site ES&H/QA program
- Executing the Integrated Safety Management System for their respective site
- Executing the Enhanced Work Planning for their respective site
- Executing the Voluntary Protection Program in the areas
- Ensuring all environmental compliance within the areas
- Executing that portion of the voluntary compliance order that pertains to the areas
- Correcting the root cause functions of the accident investigation in the areas
- Correcting the root cause functions of the voluntary compliance order for the areas.

1.2.5 Central Facilities Area Facility Manager

The Facility Manager is responsible for maintaining the assigned facility and must be cognizant of work being conducted in the facilities. The facility manager is responsible for the safety of personnel and the safe completion of all project activities conducted within the area in accordance with the site area director concept. The ARA responsibilities for OU 5-12 are identified in the *Interface Agreement Between the Environmental Restoration Program, Waste Area Groups 4, 5, 10, and D&D&D and the Central Facilities Area* (INEEL 1999a). The Facility Manager will be kept informed of all activities performed in the areas. The Facility Manager may serve as advisor to task-site personnel with regard to site operations.

1.2.6 Environmental Restoration Safety and Health/Quality Assurance Manager

The ER Safety and Health/Quality Assurance (S&H/QA) manager or designee is responsible to manage S&H/QA resources to ensure that S&H/QA programs, policies, standards, procedures, and mandatory requirements are planned, scheduled, implemented, and executed in the day-to-day operations for the ER program at the INEEL. The manager directs the S&H/QA compliance of all activities by providing technical and administrative direction to subordinate staff and through coordination with related

functional entities. The ER S&H/QA manager reports directly to the ER director. Under the direction of the ER director, the ER S&H/QA manager represents the ER directorate in all S&H/QA matters.

The ER S&H/QA Manager is responsible for the management of the following technical disciplines and implementation of the programs related to the following disciplines:

- Radiological control (RadCon) personnel
- Industrial safety personnel
- Fire protection personnel
- Quality assurance personnel
- Industrial hygiene (IH) personnel
- Emergency preparedness personnel.

1.2.7 Environmental Restoration Program Coordination Manager

The Environmental Restoration Program Coordination (ERPC) Manager is responsible for managing the environmental compliance resources to ensure that the environmental compliance requirements are planned, implemented, and executed in the day-to-day operations for the ER program at the INEEL. The manager ensures the accomplishment of all environmental compliance activities by providing technical and administrative direction to subordinate staff and by coordinating with related functional entities. The ERPC Manager reports directly to the ER Director. Under the direction of the ER Director, the ERPC Manager represents the ER directorate in all environmental compliance matters.

1.2.8 Construction Coordinator

The Construction Coordinator (CC) is responsible for field implementation of the project. The CC may delegate any or all of the responsibilities below and reports to the ER Project Manager. Responsibilities include the following items:

- Ensuring that all project tasks receive appropriate health and safety review and are in compliance with STD-101, "Integrated Work Control Process" (INEEL 1999b) before startup
- Confirming that the necessary equipment and facilities are made available to implement the provisions of this plan
- Reporting the project status to the Project Engineer.

1.2.9 Field Team Leader

The Field Team Leader (FTL) represents project management at the construction site and has ultimate responsibility for the safe and successful completion of assigned project tasks. Responsibilities include the following items:

- Managing field operations

- Executing the Work Plan
- Enforcing site control
- Documenting task-site activities
- Conducting and documenting the daily, less formal, prejob safety briefings at the start of the shift
- Serving as the primary interface with subcontractor personnel at the site, if required
- Completing the Hazards Profile Screening Checklist per STD-101, Integrated Work Control Process (INEEL 1999b)
- Ensuring compliance with waste management requirements
- Coordinating compliance to waste management activities with the Environmental Compliance Coordinator or designee.

In addition, the FTL may conduct the daily plan-of-the-day briefings at the start of the shift. All health and safety issues at the task site must be brought to the FTL's attention. The FTL reports to the CC.

The FTL ensures that a prejob briefing occurs before the project begins as per MCP-3003, "Performing Prejob Briefings and Postjob Reviews" (INEEL 1999c). A postjob review will be performed as necessary. All prejob briefings and postjob reviews must be properly documented. If the FTL leaves the project site, an alternate individual will be appointed to act as the FTL. Persons acting as FTL on the project site must meet all FTL training requirements outlined in Section 4 of the project HASP (INEEL 2000a). The identity of the acting FTL will be conveyed to task-site personnel, recorded in the FTL logbook, and communicated to the facility representative when appropriate.

If the nature of the fieldwork requires involvement of field team staffing by equipment operators, laborers, or other crafts, a representative from the organization supplying these additional resources interfaces with the FTL to provide work supervision. This representative may be designated the Job Site Supervisor (JSS).

1.2.10 Central Facilities Area Environmental Safety and Health/ Quality Assurance Manager

The CFA ES&H/QA Manager is responsible for ensuring that ES&H oversight is provided for all ER programs and projects. This person reports to and is accountable to the CFA Site Area Director. The ES&H/QA Manager performs line management reviews, inspections, and oversight in compliance with PRD-25, "Activity Level Hazard Identification, Analysis, and Control" (INEEL 1999d), and STD-101, "Integrated Work Control Process" (INEEL 1999b). Project or program management will bring all ES&H/QA concerns, questions, comments, and disputes that cannot be resolved by the Health and Safety Officer or one of the assigned ES&H professionals to the ER ES&H/QA Manager or to the CFA ES&H/QA Manager.

1.2.11 Health and Safety Officer

The Health and Safety Officer (HSO) is the person located at the task site who serves as the primary contact for health and safety issues. The HSO advises the FTL on all aspects of health and safety, which include complying with the enhanced work planning process, and is authorized to stop work at the task site if any operation threatens worker or public health and/or safety. The HSO may be assigned other responsibilities, as stated in other sections of the project HASP (INEEL 2000a), as long as they do not interfere with the primary responsibilities.

The HSO is authorized to verify compliance with the HASP (INEEL 2000a), conduct inspections, require and monitor corrective actions, monitor decontamination procedures, and require corrections, as appropriate. The HSO is supported by ES&H professionals at the task site (Safety Professional [SP], IH, Radiological Control Technician [RCT], Radiological Engineer, Environmental Coordinator, and Facility Representative, as necessary).

Persons assigned as the HSO, or alternate HSO, must be qualified (per the OSHA definition) to recognize and evaluate hazards, and will be given the authority to take or direct actions to ensure that workers are protected. While the HSO may also be the IH, SP, or in some cases the FTL at the task site (depending on the hazards, complexity and size of the activity involved, and requiring concurrence from the ER ES&H manager), other task-site responsibilities of the HSO must not conflict philosophically or in terms of significant added volume of work with the role of the HSO at the task site.

If it is necessary for the HSO to leave the task site, an alternate individual will be appointed by the HSO to fulfill this role. The identity of the acting HSO will be recorded in the FTL logbook and task-site personnel will be notified.

1.2.12 Industrial Hygienist

The assigned IH is the primary source for information regarding nonradiological hazardous and toxic agents at the task site. The IH assists the Project Engineer in completing the Hazards Profile Screening Checklist and assesses the potential for worker exposure to hazardous agents according to the INEEL *Safety and Health Manual* (Manual #14A), MCPs, and accepted industry IH practices and protocol.

By participating in task-site characterization, the IH assesses and recommends appropriate hazard controls for the protection of task-site personnel, operates and maintains airborne sampling and monitoring equipment, reviews hazard controls for effectiveness, and recommends and assesses the use of personal protective equipment (PPE) required in the project HASP, recommending changes as appropriate.

Following an evacuation, the IH, in conjunction with other recovery team members, will assist the FTL in determining whether conditions exist for safe task-site reentry, as described in the project HASP (INEEL 2000a). Personnel showing health effects (signs and symptoms) from possible exposure to hazardous agents will be referred to an Occupational Medical Program physician by the IH, their supervisor, or the HSO. The IH may have other duties at the task site, as specified in the project HASP (INEEL 2000a) or in INEEL PRDs and/or MCPs. During emergencies involving hazardous materials, airborne sampling and monitoring results will be coordinated with members of the Emergency Response Organization.

1.2.13 Safety Professional

The assigned Safety Professional (SP) reviews work packages, observes task-site activities, assesses compliance with the *INEEL Safety and Health Manual* (Manual #14A), signs safe work permits, advises the FTL on required safety equipment, answers questions on safety issues and concerns, and recommends solutions to safety issues and concerns that arise at the task site. The SP will assist the Project Engineer in completing the Hazards Profile Screening Checklist. The SP may have other duties at the task site, as specified in the project HASP (INEEL 2000a) or in INEEL PRDs and/or MCPs.

1.2.14 Fire Protection Engineer

The assigned Fire Protection Engineer reviews the work packages, conducts preoperational and operational fire hazard assessments, and provides technical guidance to site personnel regarding all fire protection issues, as needed.

1.2.15 Radiological Control Technician

The assigned Radiological Control Technician (RCT) is the primary source for information and guidance on radiological hazards. The RCT must be present at the task site during any work operations when a radiological hazard to personnel may exist or is anticipated. Responsibilities of the RCT include the following items:

- Radiological surveying of the task site, equipment, and samples
- Providing guidance for radioactive decontamination of equipment and personnel
- Accompanying the affected personnel to the nearest INEEL medical facility for evaluation if significant radiological contamination occurs
- Notifying the FTL and HSO of any radiological occurrence that must be reported, as directed by the *Radiation Protection Manual* (INEEL Manual #15B)
- Performing other duties at the task site, as specified in the project HASP (INEEL 2000a) or in INEEL PRDs and/or MCPs.

1.2.16 Radiological Engineer

The radiological engineer is the primary source for information and guidance relative to the evaluation and control of radioactive hazards at the task site. If a radiological hazard exists or occurs at the task site, the radiological engineer makes recommendations to minimize health and safety risks to task-site personnel. Responsibilities of the radiological engineer include the following items:

- Performing radiation exposure estimates and as low as reasonably achievable evaluations
- Identifying the type(s) of radiological monitoring equipment necessary for the work
- Advising the FTL and RCT of changes in monitoring or PPE
- Advising personnel on task-site evacuation and reentry.

The radiological engineer may have to perform evaluations specified in MCP-425, "Survey of Materials for Unrestricted Release and Control of Movement of Contaminated Material" (INEEL 1997a) for release of materials with inaccessible surfaces. The radiological engineer may also have other duties to perform as specified in the project HASP (INEEL 2000a) or in the INEEL *Radiation Protection Manual* (INEEL Manual #15B).

1.2.17 Sampling Team Leader

The Sampling Team Leader (STL) has ultimate responsibility for the safe and successful completion of assigned project tasks. STL oversees the sampling team and ensures that samples are collected from appropriate locations, proper sampling methods are employed, chain-of-custody procedures are followed, and shipping requirements are met. The STL reports to the FTL.

If the STL leaves the task site, an alternate individual must be appointed to act in this capacity. Persons acting as STL on the task site must meet all the same training requirements as the FTL as outlined in Section 4 of the project HASP. The identity of the acting STL will be conveyed to task-site personnel and communicated to the FTL and recorded in the FTL logbook. The identity of the acting STL will also be communicated to the CFA Site Area Director, or designee, when appropriate.

1.2.18 Sampling Team

The sampling team will perform the onsite tasks necessary to collect the samples. Team members must not enter the contamination area alone. The sampling team will consist of a minimum of two members, and the buddy system will be implemented. The IH and RADCON personnel must support the sampling team when inside a contamination area. The sampling team will be lead by the Sampling Team Leader.

1.2.19 Job Site Supervisor

The JSS is the supervisor of crafts and other Facilities, Utilities and Maintenance (FUM) personnel and serves as the representative for the FUM Department Site Services Branch at the task site. This individual is the interface between FUM and ER, and works closely with the FTL at the task site to ensure that the objectives of the project are accomplished in a safe and efficient manner. The JSS and FTL work as a team to accomplish day-to-day operations at the task site, identify and obtain additional resources needed at the task site, and interact with the HSO, IH, SP, radiological engineer, and/or RCT on matters regarding health and safety. The JSS, like the FTL, must be informed about any health and safety issues that arise at the task site and may stop work at the task site if an unsafe condition exists. The primary responsibilities of the JSS include the following:

- Managing field operations and executing the Work Plan
- Enforcing site control and documenting work site activities
- Identifying and obtaining additional resources as needed at the site
- Interacting with the IH, safety engineer, radiological engineer, RCT, and HSO on matters regarding health and safety.

1.2.20 Subcontractor Job Site Supervisor

A subcontractor JSS serves as the subcontractor safety representative at the task site. The subcontractor JSS may also serve as the subcontractor PM. The subcontractor JSS is the subcontractor field supervisor for subcontractor personnel assigned to work at the task site. The subcontractor JSS and FTL work as a team to accomplish day-to-day operations at the task site, identify and obtain additional resources needed at the task site, and interact with the HSO, IH, SP, radiological engineer, and/or RCT on matters regarding health and safety. The subcontractor JSS, like the FTL, must be informed about any health and safety issues that arise at the task site and must stop work at the task site if an unsafe condition exists. The subcontractor JSS will provide information to the FTL regarding the nature of subcontractor work input at the daily prejob briefing.

1.2.21 Task Site Personnel

All task-site personnel will understand and comply with the requirements of the project HASP (INEEL 2000a). The FTL or JSS will brief task-site personnel at the start of each shift. During the prejob briefing, all daily tasks, associated hazards, engineering and administrative controls, required PPE, work control documents, and emergency conditions and actions will be discussed. In addition, input from the project HSO, IH, and RADCON personnel to clarify task health and safety requirements will be provided. All personnel are encouraged to ask questions regarding site tasks and provide suggestions on ways to perform required tasks in a more safe and effective manner, based on the lessons learned from previous days' activities.

Once at the task site, personnel are responsible for identifying any potentially unsafe situations or conditions to the FTL, JSS, or HSO for corrective action. If it is perceived that an unsafe condition poses an imminent danger, task-site personnel are authorized to stop work immediately, then notify the FTL, JSS, subcontractor JSS or HSO of the unsafe condition.

1.2.22 Environmental Restoration Environmental Compliance Coordinator

The assigned ER Environmental Compliance Coordinator oversees, monitors, and advises the PM and FTL on environmental issues and concerns regarding task-site activities. This individual ensures compliance with DOE orders, EPA regulations, and other regulations concerning the effects of task-site activities on the environment. The Environmental Compliance Coordinator provides support surveillance services for hazardous waste storage and transport and surface water/storm water runoff control. The Environmental Compliance Coordinator will assist the Project Engineer in completing the Hazards Profile Screening Checklist.

1.2.23 Quality Engineer

The Quality Engineer provides guidance on task-site quality issues, when requested. This individual observes task-site activities and verifies that task-site operations comply with quality requirements pertaining to these activities. The quality engineer identifies activities that do not comply or have the potential for not complying with quality requirements, and suggests corrective actions.

1.2.24 Waste Generator Services

Waste Generator Services (WGS) has the responsibility to manage all waste generated at the INEEL. This includes managing waste streams from the point of generation to accomplish proper treatment, storage, transportation, and disposal following appropriate federal, state, and company regulations, procedures and guidance. The assigned WGS representative will work with other waste specialists and WAG-5 project personnel in planning for treatment and disposal of wastes prior to waste

generation. Additionally, the WGS representative will maintain records associated with the project waste in accordance with company requirements.

1.2.25 Sample Management Office

The INEEL Sample Management Office (SMO) is responsible for obtaining necessary laboratory services as required. The SMO ensures that data generated from samples collected and analyzed meet the needs of the project by validating all analytical laboratory data to resident protocol, and ensuring that data are reported to the project personnel in a timely fashion as required by the Federal Facility Agreement and Consent Order.

The assigned SMO representative will interface with the PM or designee during the preparation of the SAP database as required by MCP-227, Sampling and Analysis Process for CERCLA and D&D Activities (INEEL 1999e). This individual also provides guidance on the appropriate number of field quality control samples required by the QAPjP (DOE-ID 2000a), provides guidance on the appropriate bottle size and preservation for sample collection, and ensures the sample identification numbers used by the project are unique from all others ever assigned by the Integrated Environmental Data Management System. The preparation of the plan database, along with completion of the SMO services request form (INEEL Form Number 435.26), initiates the sample and sample waste tracking activities performed by the SMO.

The SMO-contracted laboratory will have the overall responsibility for laboratory technical quality, laboratory cost control, laboratory personnel management, and adherence to agreed-upon laboratory schedules. Responsibilities of the laboratory personnel include preparing analytical reports, ensuring chain-of-custody information is complete, and ensuring all quality assurance/quality control (QA/QC) procedures are implemented in accordance with SMO-generated task order statements of work and master task agreements.

1.2.26 Nonworkers

All persons who may be on the project task site, but are not part of the field team, are considered nonworkers for the purposes of this project (e.g., surveyor, equipment operator, or other craft personnel not assigned to the project).

- A person who is considered "onsite" is present in or beyond the designated support zone.
- Nonworkers will be deemed occasional site workers per 29 Code of Federal Regulations (CFR) 1910.120/1926.65, and must meet minimum training requirements for such workers as described in the OSHA standard and any additional site-specific training as identified in Section 4 of the project HASP (INEEL 2000a).
- If the nature of a nonworker's tasks requires entry into the work control zone, then the nonworker must meet all the same training requirements as the workers.
- A site representative must accompany all nonworkers until they have completed their 24-hour supervised field experience.

1.2.27 Visitors

All visitors with official business at the project task site, including INEEL personnel, representatives of DOE, or state or federal regulatory agencies, may not proceed beyond the support zone without receiving project-specific HASP training. They must also sign the HASP training

acknowledgement form, receive a safety briefing, wear the appropriate PPE, and provide proof of meeting all training requirements as specified in Section 4 of the project HASP (INEEL 2000a).

Visitors will be escorted by a fully trained task-site representative (such as the FTL, JSS, or HSO, or a designated alternate) at all times while on the task site.

A casual visitor to the task site is a person who does not have a specific task to perform or other official business to conduct at the task site. Casual visitors are not permitted on the project task site.

2. SITE BACKGROUND

2.1 Site Description

Located 51 km (32 mi.) west of Idaho Falls, Idaho, the INEEL is a government-owned, contractor-operated facility managed by the DOE-ID (Figure 2-1). Occupying 2,305 km^2 (890 mi^2) of the northeastern portion of the Eastern Snake River Plain, the INEEL encompasses portions of five Idaho counties: Butte, Jefferson, Bonneville, Clark, and Bingham.

WAG 5 is in the south-central portion of the INEEL and comprises the ARA and the PBF (Figure 2-2). The ARA consists of four separate operational areas designated as ARA-I, ARA-II, ARA-III, and ARA-IV. Once known as the Special Power Excursion Reactor Test (SPERT) facilities, PBF consists of five separate operational areas: the PBF Control Area, the PBF Reactor Area (SPERT-I), the Waste Engineering Development Facility (SPERT-II), the Waste Experimental Reduction Facility (SPERT-III), and the Mixed Waste Storage Facility (SPERT-IV). Collectively, the Waste Experimental Reduction Facility, the Waste Engineering Development Facility, and the Mixed Waste Storage Facility are known as the Waste Reduction Operations Complex (WROC). The following sections describe the ARA-01, ARA-12, and ARA-23 contaminated soil sites that will require sampling under this FSP.

2.1.1 ARA-01: ARA-I Chemical Evaporation Pond

The ARA-01 site is a shallow, unlined surface impoundment, roughly 30 × 90 m (100 × 300 ft) in size, that was used to dispose of laboratory wastewater from the ARA-I Shop and Maintenance Building (ARA-627). Located southeast of ARA-I (see Figure 2-3), the pond was constructed in 1970 by excavating soil to create a shallow topographic depression. Basalt outcrops are present within and immediately adjacent to the pond. The subsurface immediately beneath the pond consists of fracture and rubble zones. No interbed was found within the first 36 m (118 ft).

2.1.2 ARA-12: ARA-III Radioactive Waste Leach Pond

The ARA-12 site is an unlined surface impoundment constructed in a natural depression west of ARA-III across Wilson Boulevard (see Figure 2-4). The ARA-III facility was an active reactor research facility from about 1959 to 1965. The pond was constructed to receive low-level liquid waste from reactor research operations. Liquid waste was stored temporarily in tanks, then transferred to the leach pond via an underground pipe. A second, separate line to the leach field originated in an uncontaminated water storage tank (ARA-709). A third source of effluent was facility runoff via a culvert. The depressional area within ARA-12 measures approximately 50 × 115 m (164 × 377 ft), although the portion of the pond historically exposed to wastewater is thought to be much smaller in area. In 1991, the culvert was plugged in preparation for D&D&D operations at ARA-III. The tanks and waste lines to the leach pond were removed in 1993 during the D&D&D of ARA-III.

2.1.3 ARA-23: Radiologically Contaminated Surface Soils and Subsurface Structures Associated With ARA-I and ARA-II

The ARA-23 site is a large, roughly oval-shaped windblown contamination site encompassing the SL-1 Burial Ground and the remnants of the ARA-I and ARA-II facilities (see Figure 2-5). The long axis of the site is consistent with the generally southwest to northeast winds common on the INEEL. Soils were radiologically contaminated by the 1961 SL-1 reactor accident and subsequent cleanup. Minor

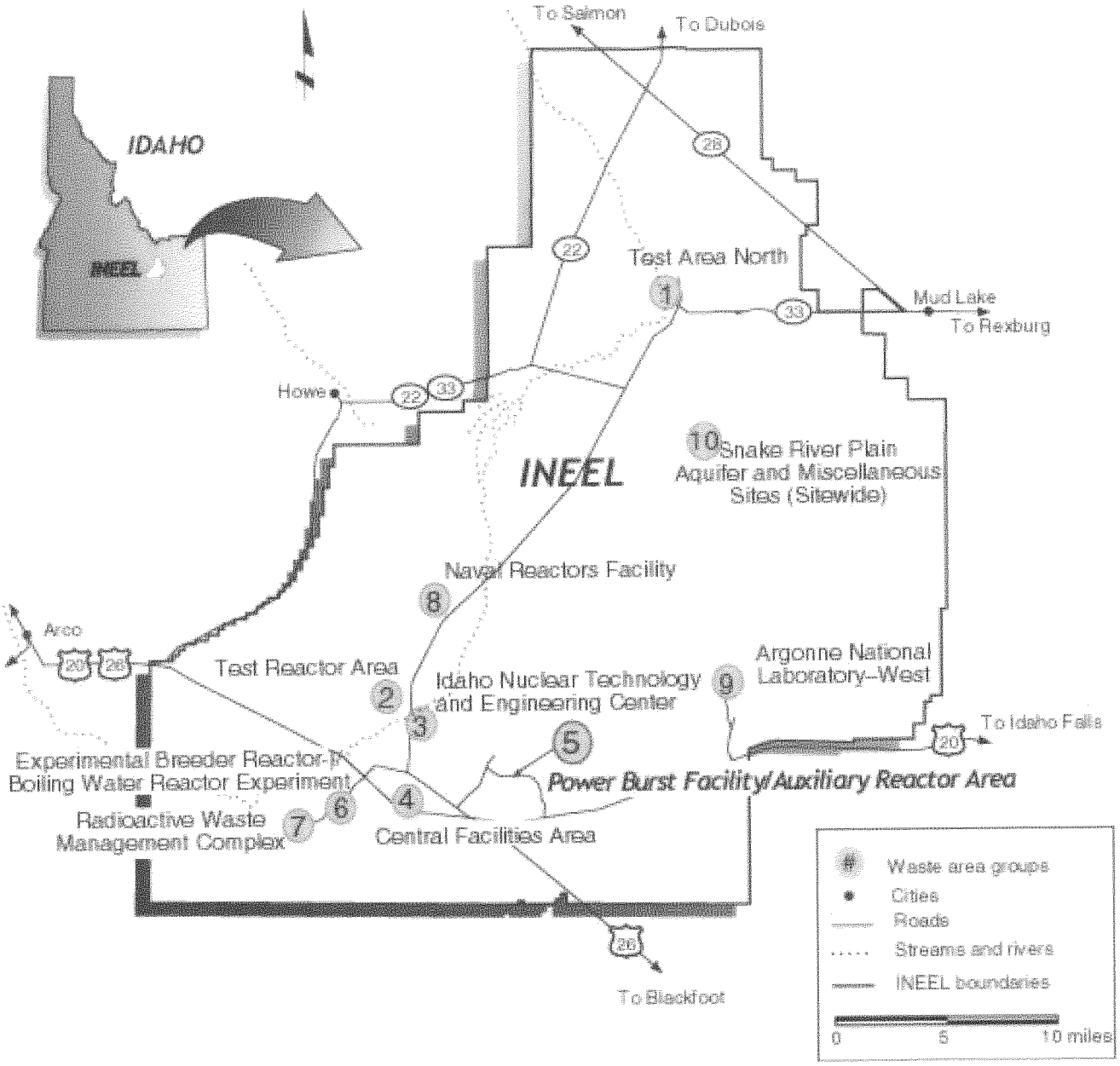

Figure 2-1. Location of WAG 5 at the INEEL.

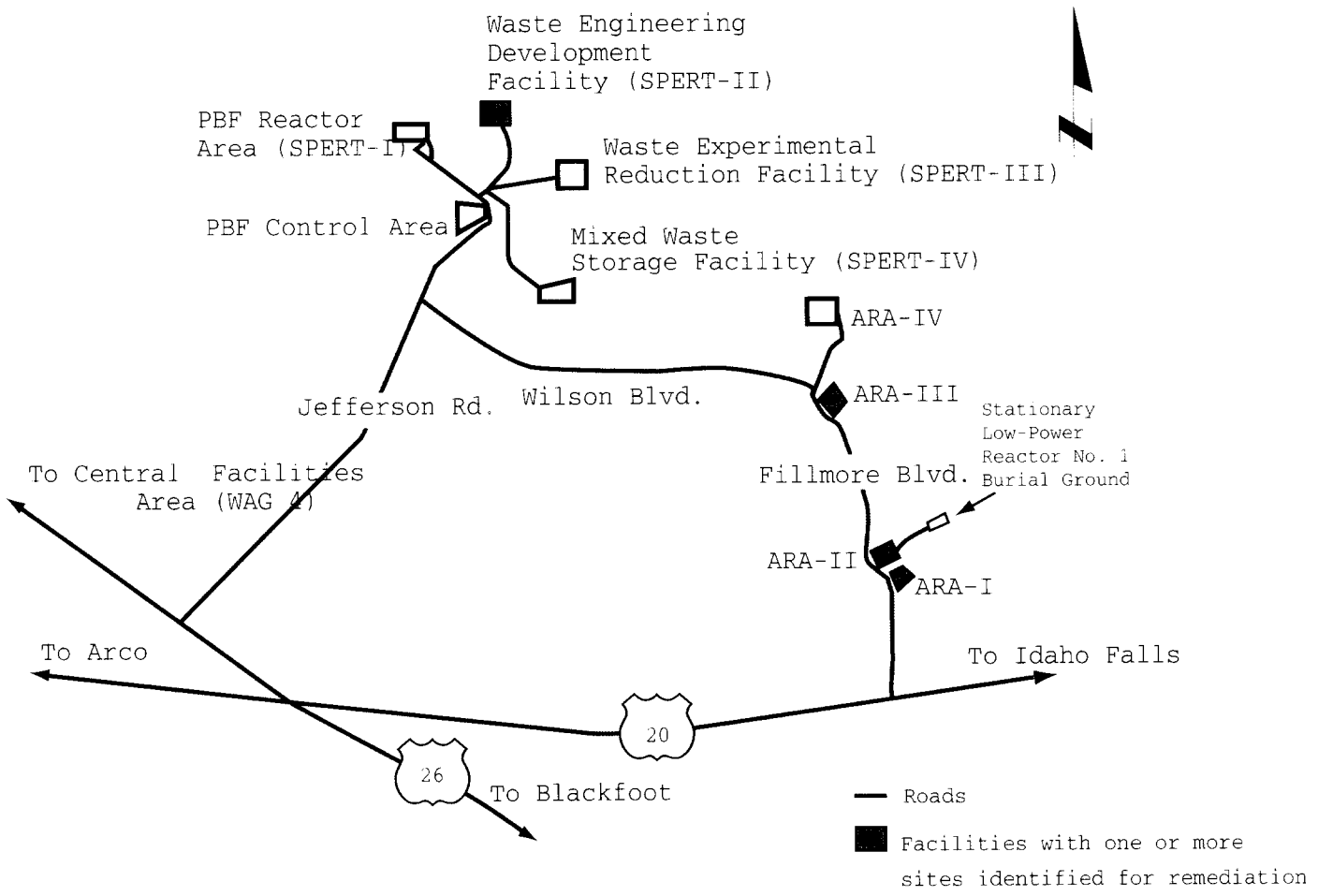

Figure 2-2. Detail of ARA facilities within WAG 5.

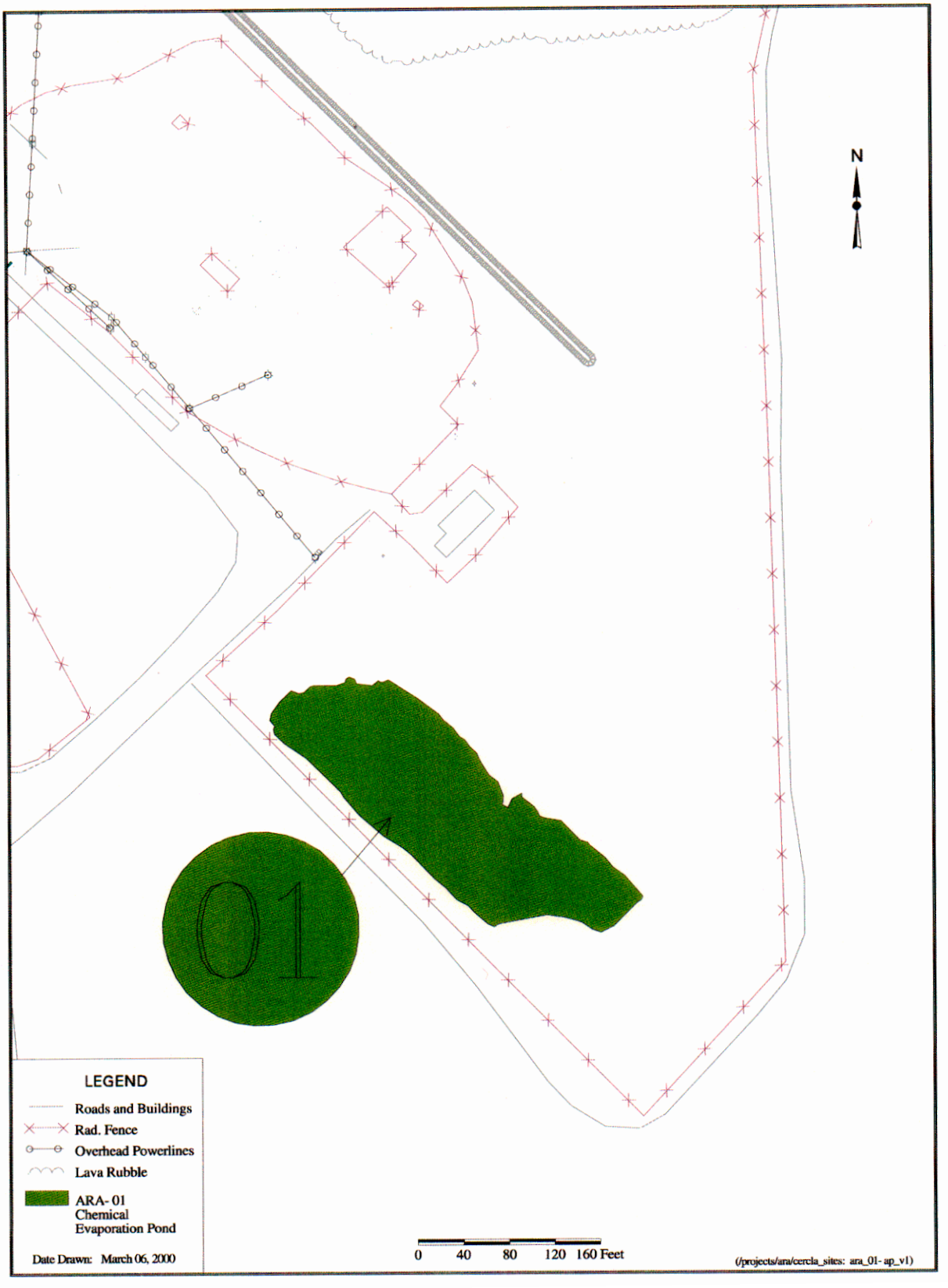

Figure 2-3. Areal view of ARA-01 site showing estimated extent of contamination.

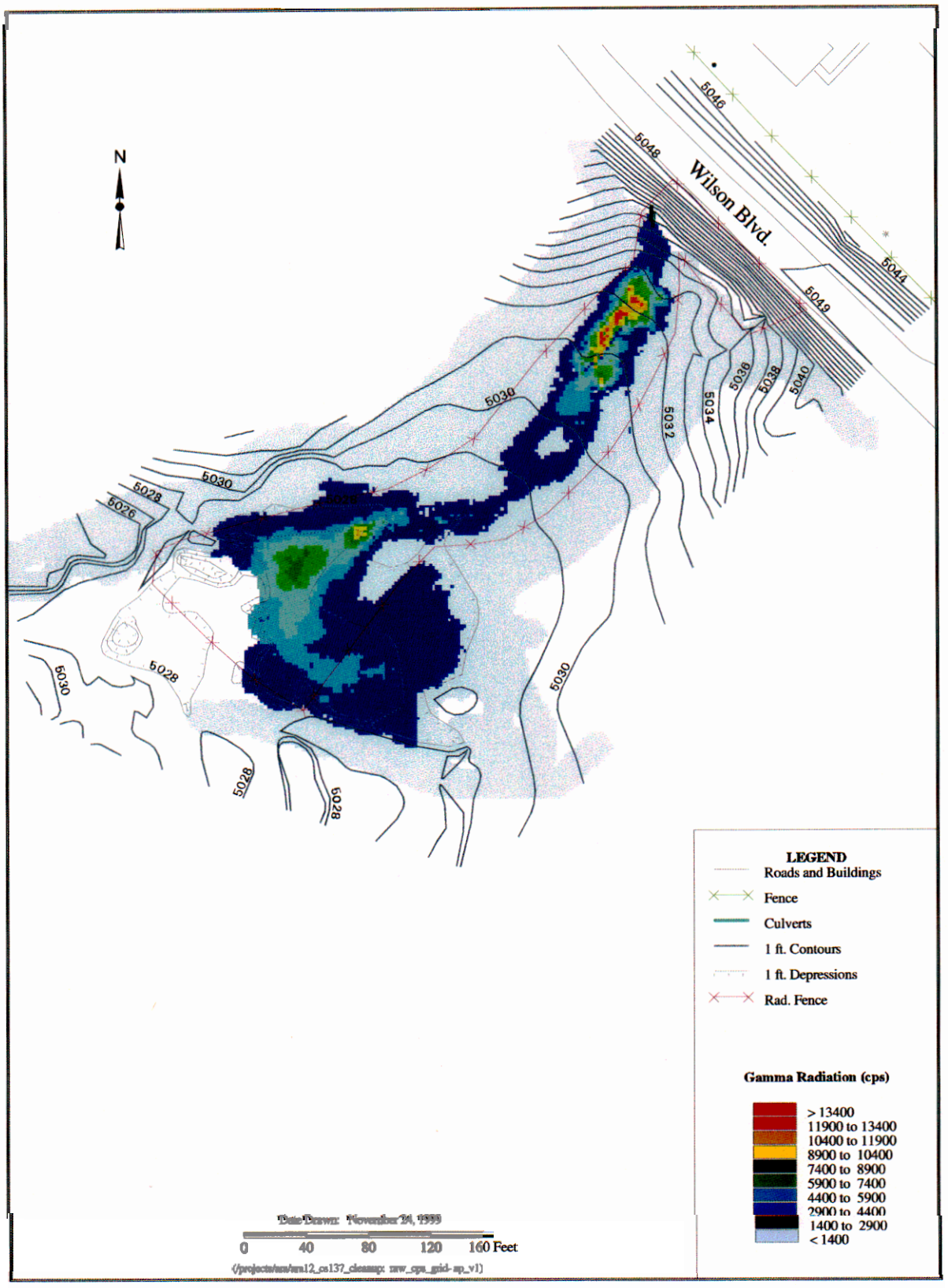

Figure 2-4. Location of ARA-12 with gamma survey showing radiological hot spots.

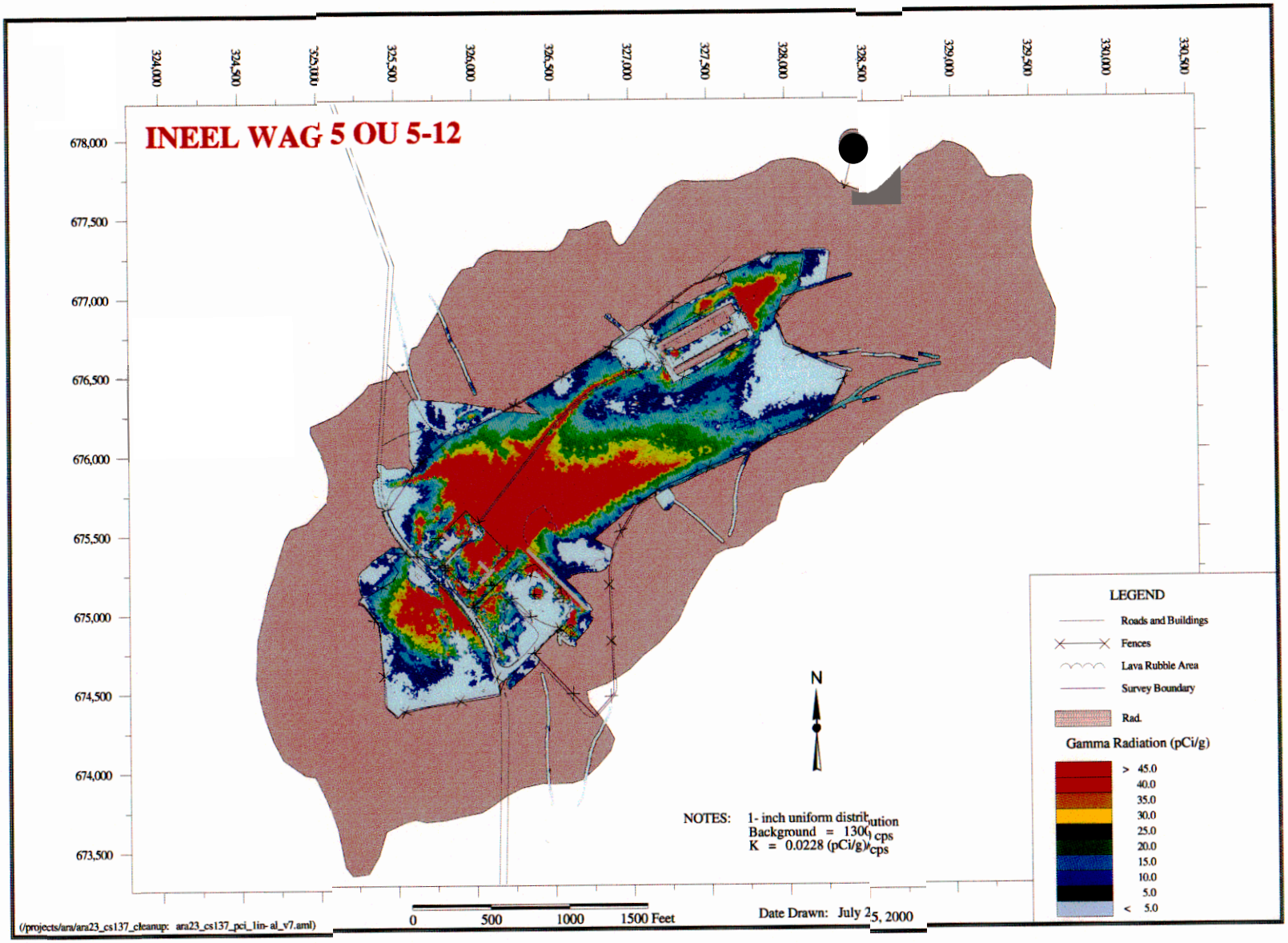

Figure 2-5. Areal view of ARA-23 site with detailed gamma survey showing extent of Cs-137 contamination.

amounts of contamination may have been added by other ARA operations. Over time, winds dispersed the contamination over an area roughly 100 ha (240 acres) in size.

2.2 Nature and Extent of Contamination

Remedial action is required for three contaminated soil sites: the ARA-I Chemical Evaporation Pond (ARA-01), the ARA-III Radioactive Waste Leach Pond (ARA-12), and the ARA-I and ARA-II Radiologically Contaminated Soils (ARA-23). Remediation of the ARA-25 site was covered under the Phase 1 FSP (DOE-ID 2000). Though risks for the five contaminated soil sites were analyzed individually, they were considered collectively for the analysis of remedial alternatives. The following sections provide a brief description of the three remaining contaminated soil sites that require remediation. Detailed information about the individual sites can be found in the WAG 5 Comprehensive Remedial Investigation/Feasibility Study report (Holdren et al. 1999).

2.2.1 ARA-01: Chemical Evaporation Pond

From 1970 to 1988, the pond received process discharges that contained small quantities of radioactive substances, acids, bases, and volatile organic compounds. Since 1988, the pond has been dry except during spring runoff and heavy precipitation. Based upon data collected during a 1982 sampling event, results of the ARA-01 baseline risk assessment (Stanisich et al. 1992), and additional sampling conducted as part of the Final Work Plan for Waste Area Group 5, Operable Unit 5-12 Comprehensive Remedial Investigation/Feasibility Study, (DOE-ID 1997a), a risk assessment was performed. The human health risk assessment identified arsenic as a contaminant of concern (COC) based on human health risk estimates. In addition, the ecological risk assessment identified selenium and thallium as COCs based on hazard quotients for ecological receptors. Figure 2-3 also shows the estimated boundary of contamination at ARA-01.

2.2.2 ARA-12: ARA-III Radioactive Waste Leach Pond

The Track 2 evaluation initiated in 1993 and completed in 1994 (Pickett et al. 1994) determined that a total risk of 2E-03 was estimated for the 100-year future residential nonintrusion scenario, primarily due to direct exposure to Ag-108m, Cs-137, and U-238. As part of the Waste Area Group 5, Operable Unit 5-12 Comprehensive Remedial Investigation/Feasibility Study, (Holdren et al. 1999), a survey of the ARA-12 surface soil was conducted with the global positioning radiometric scanner (GPRS). Initially, the elevated gamma levels were attributed to cesium (Cs)-137, but subsequent soil sample analyses showed silver (Ag)-108m to be the source (Giles 1999). The human health risk assessment identified Ag-108m as a COC for ARA-12 based on human health risk estimates. The ecological risk assessment determined that copper, mercury, and selenium were COCs based on hazard quotients for ecological receptors. Figure 2-6 provides the results of the in situ gamma survey of ARA-12 and estimated Ag-108m concentrations in the top 2.54 cm (1 in.) of soil. Four soil samples were collected and analyzed for TCLP and total metals in 1999 to demonstrate that the ARA-12 soils were not characteristic for metals. TCLP metals analysis shows that all analytes are either non-detect, or below the maximum concentration for the toxicity characteristic. Additionally, totals data for metals are all within acceptable ranges for INEEL soils. Specifically for silver, three of the TCLP samples were non-detect, and the fourth showed a concentration of 295 µg/L. Silver was non-detect in all four total metals samples (Kirchner 1999).

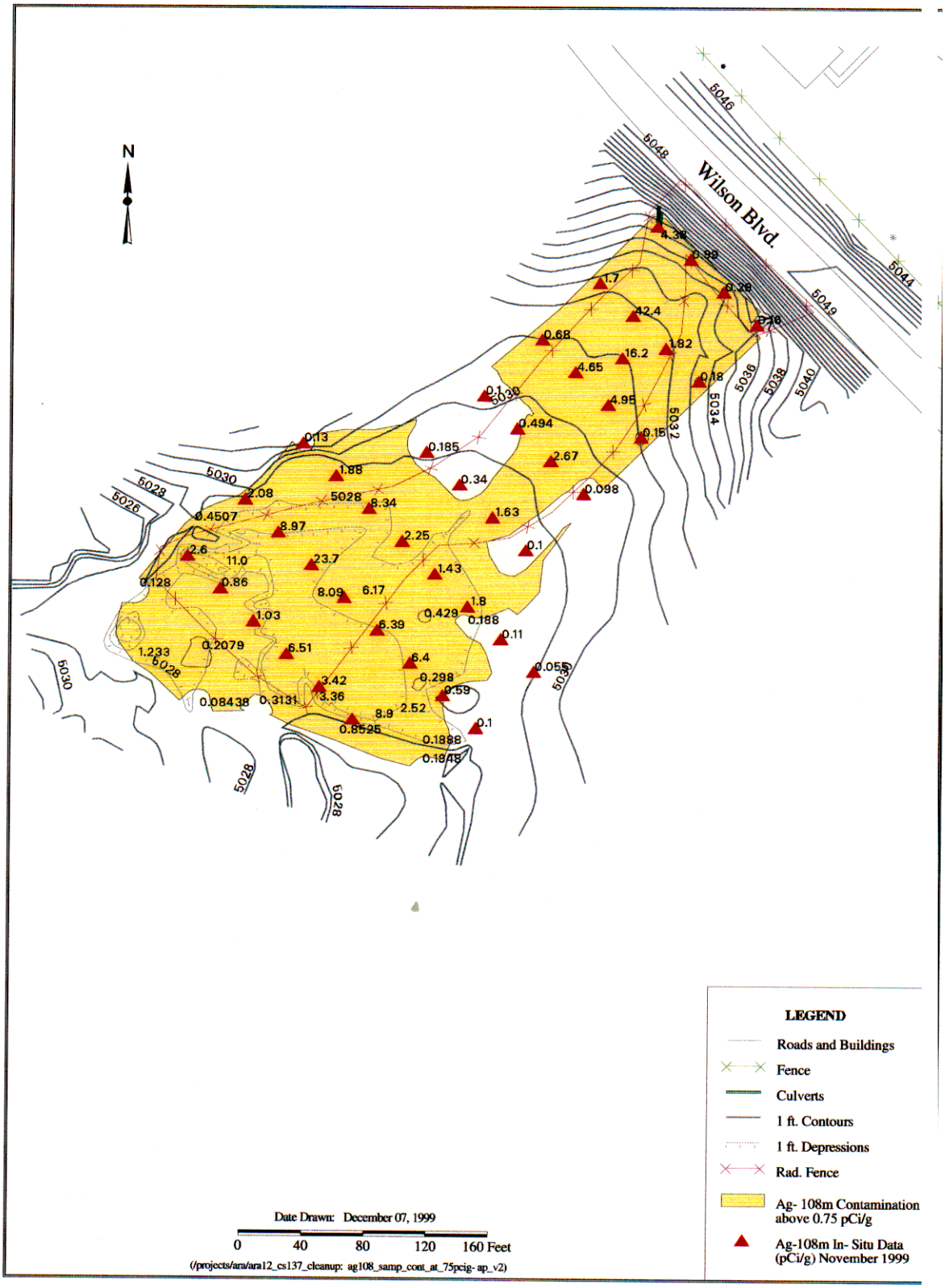

Figure 2-6. Results of in situ gamma spectroscopy measurements at the ARA-12 site showing the 0.75pCi/g isopleth for Ag-108m.

2.2.3 ARA-23: Radiologically Contaminated Surface Soils and Subsurface Structures Associated With ARA-I and ARA-II

A Track 1 investigation was initiated for ARA-23 in 1993, but was not finalized because the site was reassigned to OU 10-06 for evaluation. The OU 10-06 evaluation, which excluded the areas within the ARA-I and ARA-II facility fences, was only partially completed before ARA-23 was reassigned to WAG 5 for final disposition. The data gaps identified in the WAG 5 Work Plan (DOE-ID 1997a) comprised the horizontal and vertical extent of Cs-137 in the windblown soil area and the presence of other radionuclides such as cobalt (Co)-60, europium (Eu)-152, Eu-154, strontium (Sr)-90, and uranium isotopes. Based on the sampling and analytical results combined with the surface gamma-radiation survey conducted using the GPRS, a risk assessment was performed. Cesium-137 was identified as the primary contributor to the estimated total risk for all pathways. The ARA-23 site was screened for evaluation in the ecological risk assessment because the only contaminants above background levels are radionuclides. Figure 2-5 also provides the results of the in situ gamma survey of ARA-23 and estimated Cs-137 concentrations in the top 2.54 cm (1 in.) of soil.

2.3 Project Description

Based on consideration of the requirements of CERCLA, the detailed analysis of alternatives, and public comments, the Agencies have chosen removal and disposal as the selected remedy for the contaminated soil sites. Performance standards were implemented as design criteria for each of the contaminated soil sites to ensure that the selected remedy is protective of human health and the environment. Five-year reviews will be used to ensure that the selected remedies remain protective and appropriate.

2.3.1 Contaminated Soil Sites

The selected remedy for the WAG 5 contaminated soil sites, as identified in the ROD, is removal and on-Site disposal of the contaminated soil at the INEEL. This remedy was selected based on the results of the comparative analysis of alternatives. Removal and disposal is the least costly alternative that meets the threshold criteria (i.e., the remedy provides overall protection of human health and the environment and satisfies applicable or relevant and appropriate requirements [ARARs]), removal and disposal is easily implemented because the required equipment already exists at the INEEL and it has a high long-term effectiveness because contamination will be permanently removed from the sites. The estimated time required to complete remediation is 18 to 24 months. The following activities will be conducted to complete remediation of the contaminated soil sites ARA-01, ARA-12, and ARA-23 (DOE ID 2000b):

- Soil with contaminant concentrations in excess of the remediation goals will be removed using conventional earth-moving equipment (e.g., scrapers and backhoes). Remediation goals are identified in Table 2-1.
- Surface soils inside the SL-1 burial ground (OU 5-05) exceeding the Cs-137 remedial action goal of 23 pCi/g will be remediated as part of ARA-23 under OU 5-12.
- Real-time analyses for radionuclides and near real-time analyses for metals will be used before and during excavation to delineate the extent of contamination for removal. Real-time analyses for radionuclides and soil sampling and laboratory analysis for radionuclides and metals will be used to verify that remediation goals have been met.
- Contaminated soil will be characterized and sent to the INEEL CERCLA Disposal Facility (ICDF) or other location within the INEEL for permanent disposal.

Table 2-1. WAG 5 contaminated soils remedial action goals.[a]

Site	Contaminant of Concern	Soil Concentration Remedial Action Goal
ARA-01	Arsenic	10 mg/kg
	Selenium	2.2 mg/kg
	Thallium	4.3 mg/kg
ARA-12	Ag-108m	0.75 pCi/g
	Copper	220 mg/kg
	Mercury	0.5 mg/kg
	Selenium	2.2 mg/kg
ARA-23	Cs-137	23 pCi/g

a. DOE-ID 2000b.

- Institutional controls consisting of signs, access controls, and land-use restrictions will be established and maintained, depending on the results of postremediation sampling. However, institutional controls will not be required after remediation if all contaminated media are removed to basalt or if contaminant concentrations are comparable to local background values. Otherwise, institutional controls will be maintained until 2095 or discontinued sooner based on the results of a 5-year review.
- Five-year reviews will be conducted for remediated sites with institutional controls.

Removal of contaminated soil will be achieved using conventional excavation equipment. The relatively shallow depths of contaminated soils at WAG 5 sites will allow for excavation using front-end loaders, backhoes, and soil vacuum equipment.

Areas planned for excavation will be gridded, characterized, and excavated in discrete depth intervals. Real-time gamma surveys using large plastic scintillators, sodium-iodide detectors, germanium spectrometers, and near real-time x-ray fluorescence spectrometry for toxic metals will be used both before and during excavation to delineate the extent of contamination for removal and to minimize the volume of uncontaminated soil removed. Excavation will only proceed to the depths at which contamination above the remediation goals is encountered. Sampling and analysis of soils underlying clean intervals will be used to verify that all soil with contaminant concentrations above the remediation goals is removed.

Current radiological control practices will be implemented to minimize radiation exposure to the workers. Radiological controls consist of limiting the amount of time an operator can work in the area, requiring personnel to wear personal protective clothing, and using distance and shielding to reduce radiation exposure. Air emissions will be controlled by the use of water sprays or soil fixatives to suppress dust during soil excavation and removal. Additionally, air monitoring may be conducted by the RadCon organization to ensure that dust suppression methods are effective in protecting personnel.

Dump trucks will be positioned near the excavation so that loaders and backhoes can place the contaminated soil directly into the dump truck. A tarp will be unrolled over each truck box and secured to prevent accidental release during transit. The dump trucks will transport the soil to the ICDF or another approved location on the INEEL. Currently, the ICDF WAC are under development, and have not been published; however, it is anticipated that the soils from the ARA-01, ARA-12, and ARA-23 sites will not

exceed the ICDF WAC. Additionally, existing characterization data will be used for the purposes of waste profiling and demonstration that the soils meet the yet to be developed ICDF WAC.

Following remediation, excavations exceeding 0.3 m (1 ft) in depth will be backfilled with uncontaminated soil or sloped to promote drainage. Shallow excavations will be contoured to blend with the existing landscape. Sites will be vegetated in accordance with INEEL guidelines (DOE-ID 1989).

Post-remediation requirements for institutional controls at each soil site, such as signs, access controls, and deed restrictions, will be determined after soil removal. Institutional controls will not be required if all soil down to basalt is removed and concentrations of residual contamination on the exposed basalt or remaining soil are comparable to background values. Otherwise, institutional controls will be maintained until 2095 or until restrictions are removed through a 5-year review.